

## Detailed Description

Referring to FIG.1 a stringed musical instrument having a neck as illustrated in section A-A.

FIG. 2 is a side view of the preferred embodiment of the invention which is neck through type construction with a fingerboard 1 made of wood.

FIG. 4-7 the improved method of construction of the present neck for a stringed musical instrument comprises shaping a length of wood 3 (hard maple or mahogany) illustrated as a front view in FIG. 3 either by hand or mechanical means such as commercial wood carving machine, either computer controlled or manually operated to the desired shape of a typical stringed musical instrument neck.

Next the front face of the length of wood 3 is machined flat to accept the installation of a (compression) strengthening beam 2. Then a slot is routed in the rear face or curved portion of the neck .375 inch wide by .125 inch deep for the installation of a (tension) strengthening beam 4.

Referring to FIG. 5-7 a slot .250 inches wide and .410 inches deep is routed into the center of the flat face of the wood 3 at a length that as required and a two way truss rod 7 is installed in the slot and secured with a small amount of silicone adhesive. An alternative would be to execute this step after strengthening beam 2 has been installed.

FIG. 5 strengthening beam 2 is cut to the proper size to fit upon the flat surface of the wood 3 and adhesively secured. In the preferred embodiment of the invention the strengthening beam 2 is cut from commercially available graphite plate of either .050 or .070 thickness, an adhesively bonded to the flat machined surface of the wood 3. An alternative, if not commercially available, is to construct the strengthening beam 2 from several layers of carbon cloth and uni-directional graphite in epoxy resins upon a flat caul and laminate bond to the wood 3. This sub-assembly 8,9, and 10 is best illustrated in FIG. 7.

FIG. 5-7 strengthening beam 4 is cut from commercially available graphite rod stock, which is rectangular in its cross sectional shape, and length dependent upon stringed musical instrument type (guitar or bass). Strengthening beam 4 is then bonded in the slot located in the curved portion of the neck FIG. 5.

After curing of bonding adhesives beam 4 is sanded and faired into the curvature of the back of the wood 3.

Next an external strengthening shell 5 is constructed FIG. 7. In the preferred embodiment of the invention the shell would be made upon a mold. Female or Male type can be used, but a female mold will yield more consistent results. The mold may be made by anyone experienced in composite mold making methods and practices and should be constructed so that the inside shape of the strengthening shell 5 will have a glove like fit upon the curved portion of the wood 3 and beam 4, and the outside surface will be the finished portion of the curved part of the neck as shown in FIG. 5 and 6.

The strengthening shell 5 is made from several layers of carbon cloth and epoxy

resins with the weave of the cloth placed at a 45 degree angle to the longitudinal axis of the mold. This placement of the cloth as shown in FIG. 7 produces a mechanical truss assembly. Standard composite manufacturing practices may be employed, specifically vacuum bagging to 20 inches HG, and the resin may be heat cured not to exceed 140 F for a time of 4 hours.

Next the strengthening shell 5 is removed from the mold and trimmed to fit the wood 3 and is adhesively bonded to the wood 3 and the compression beam 2 and the tension beam 4, as illustrated in FIG. 6. This assembly now acts as a box spar, and the stiffness and strength of the assembly is greater than the sum of parts (wood 3 and the composite components 2, 4, and 5).

Next a fingerboard 1 of wood is bonded to the flat beam 2 and fared into the neck. Then referring to FIG. 4 a plurality of fret slots 6 are cut into the surface of the fingerboard 1. Then frets are pressed in.

Referring to FIG. 6 is a cross sectional view of the finished assembly drawn to scale and illustrating the relative proportions of the components.

Referring to FIG. 8 is a geometric force vector flow diagram illustrating the loads imposed by the plurality of strings F and the resulting radial load E on the entire structure, and how the design of this invention redistributes said loads. The individual loads and vectors created by string tension are: compression load A carried by 2 (FIG 4,5,6,7), a semi-tension load B carried by 4 (FIG 4,5,6,7), a crush load C generated by the opposing forces of A and B and carried by 3 (FIG 4,5,6,7), and distributed into the outer skin truss 5 (FIG 4,5,6,7), with D representing the redirection of loads A, B, and C as opposing forces to the original compression load A.

Having now described the preferred embodiment of the present invention, it should be apparent to those skilled in the art that other embodiments and modifications thereof are contemplated as following within the scope of the present invention as defined by the appended claims.